THE DEMAND AND SUPPLY OF TRADESMEN : TASMANIA'S FUTURE PROSPECTS IN THE AUTOMOTIVE INDUSTRY.

by

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This dissertation is submitted
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I, the undersigned, hereby certify that this dissertation represents my own original work, that it contains no material which has already been published, or otherwise used by me, and that to the best of my knowledge it contains no copy or paraphrase of material previously written by another person or authority except where due acknowledgment is made.

David John Quinn

PREFACE

For a number of years there appears to have been shortages of suitably qualified tradesmen in most trades. Further it has been suggested that due to a misallocation of resources within the education system (i.e., an over-emphasis of higher education) the problem will not be solved by current apprenticeship completions. The present undersupply situation is thus expected to continue and perhaps worsen over the next four years.

The purpose of this study is to examine the situation as it applies to the automotive industry in Tasmania; to substantiate or repudiate the claim and suggest suitable corrective measures if these are required.

In conducting this study a total of 81 firms, representing approximately 60% of the Tasmanian automotive industry, were personally surveyed. The material reproduced in Chapters 3, 4 and 5 should prove of particular interest to these firms.

The format adopted is as follows. In Chapter 1 the topic is introduced, set in context and the problem to be analysed stated explicitly.

Chapter 2 outlines the analytical framework adopted, explaining how the methodology chosen had to be sufficiently flexible to deal with an applied problem of this type, in addition to being theoretically rigorous.

The stock flow model developed in Chapter 2 is combined with the survey data in Chapter 3 and estimates of the expected future

demand and supply in the five trades covered, are made.

The results, the limitations therein and how the approach adopted could be improved upon are discussed in Chapter 4. The responses to the more descriptive survey questions are also presented in this Chapter. They support the results of the calculations made in Chapter 2, in addition to providing an explanation of how the present imbalance has occurred, and suggestions of how it may be overcome.

Finally, Chapter 5 summarizes the problem, and presents the final conclusions and recommendations. Although some of the problems discussed are unique to the automotive industry, many others are not. This Chapter therefore has relevance to all occupations in which training is based on an apprenticeship, or similar, system and where the ability to employ apprentices is closely related to the size of the employing firm.

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CHAPTER 1.

INTRODUCTION

1.1 Statement of the problem

Despite the apparent preoccupation of many policy makers with the higher academic disciplines, society as we know it requires a stock of suitably qualified persons at the trade level. The recent trend in society towards emphasizing higher levels of education has served to make trades increasingly unattractive to young people, who have become socially conditioned to expect something more than a manual occupation. This social conditioning is not confined to young persons and many qualified tradesmen have put down their tools in search of something better.

Unfortunately the need for trades and tradesmen has not decreased to accommodate this social change, and it is here that the problem begins to develop. The present rate of adult unemployment in Tasmania is between 3.5 and 4%.[1] The rate of unemployment of tradesmen in the automotive industry is only 1.2%[2], with registered vacancies actually exceeding registered unemployed.

The purpose of this study is firstly, to examine the future employment prospects of tradesmen in the automotive industry in Tasmania. Secondly, to assess the ability of the existing apprenticeship system to supply the required number of tradesmen to meet the

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1. Based on as yet unpublished Australian Bureau of Statistics sample estimates.

2. Based on Commonwealth Employment Service statewide check of registered unemployed (30.9.1977) and survey estimates of workforce size. (Table 3c.)

expected future demand and thirdly, to provide recommendations for improvements should the existing apprenticeship system appear to be inadequate.

1.2 The Automotive Industry

The decision to restrict the enquiry to one industry was one of necessity rather than choice. Primarily the decision to concentrate on one industry was taken in order to keep the task within manageable proportions. The automotive industry was chosen because it is a major employer of tradesmen and therefore deserving of study, and because it was envisaged that the required statistical information would be available for this industry.

The industrial structure in the automotive industry has changed markedly over the last four years. The large franchised dealers, who in 1972-73 accounted for more than 50% of the retail service work[3] done in the industry, have had their market share decreased to approximately 30%. The high overhead costs associated with maintaining large workshops has meant that these firms have been unable to compete with small firms in terms of the labour rate charged per hour of service. They have responded by trying to rationalise the size of their service operations. These rationalizations have taken the form of

(1) closure of bodyworks.
(2) decreased employment of unskilled and semiskilled labour such as messenger boys, car cleaners, odd-jobs men and tea ladies.

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3. The term "retail service work" refers to service work which is actually paid for by the consumer. Warranty work, which is paid for by the manufacturer has not been affected. From the franchised dealers' point of view this is of little comfort as the wage rate allowed on such work is set by the manufacturer, at a level which is often below cost.

(3) decreased employment of tradesmen on retail work, and,

(4) decreased intake of apprentices.

The problem faced by many of the large firms is that despite their attempts to rationalize, they are still unable to justify their present level of operation in terms of a satisfactory rate of return on investment.[4] Discussions with the management of such firms disclosed a widely held belief that, with the move towards a taxation financed welfare state, there is no incentive for private business to expand and take risks. The expected after-tax return for so doing is not sufficient to compensate for the additional risk involved.

The problems faced by the larger firms would tend to imply a gloomy future for tradesmen in the automotive industry. This is not the case as the adjustment has been taken up by smaller concerns such as petrol stations, partnerships and a mushrooming of backyard operators. The speed with which these smaller firms have been able to setup has further eroded the competitive position of the larger firms, who are unable to compete on a price basis and must therefore rely on offering a superior quality of workmanship, along with the ability to handle the larger jobs which the smaller firms cannot.[5]

Unfortunately, the ease with which tradesmen have found alternative employment, with smaller firms, has not been matched by those seeking apprenticeships. It is this failure of the market to ensure

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4. Owner-managers of both large and small firms often commented during interviews that they would be better off (financially and mentally) if they sold out, invested the money in a bank on fixed deposit and went to work for someone else.

5. The lower profitability on larger jobs also results in smaller firms who have sufficient work, being disinterested in doing this work anyway.

that sufficient places exist for apprentices which perpetuates the present undersupply of tradesmen. The basic problem which this paper sets out to tackle is thus the anomalous situation of excess demand for tradesmen accompanied by a deficient demand for apprentices.

1.3 Definition of tradesman

From the outset a universally acceptable[6] definition of tradesmen was required. For the course of this study a tradesman is defined as a person, either male or female, who holds a formally recognized trade qualification, such as a four-year indentured apprenticeship. This definition proved to be both serviceable and consistent with the general usage of the term in industry.

1.4 List of trades covered

Due to the comparatively small size of the automotive industry in Tasmania some specialist trades provide insufficient numbers to generate meaningful results. It was thus decided to investigate only the following five trades

(a) Automotive Electrician
(b) Diesel Mechanic
(c) Motor Mechanic
(d) Panel Beater
and (e) Vehicle Painter.

With the exception of diesel mechanics it was possible to obtain satisfactory data for each of these trades. The diesel mechanic

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6. The definition adopted must be "universally accepted" in that it must be both consistent with previously collected statistical data and also with the general usage of the term "tradesmen" in industry. An alternative, narrower definition which excluded those persons who failed their technical training, and hence did not obtain the Certificate of Proficiency issued by the Apprenticeship Commission, was rejected on these grounds.

category provided particular problems due to the existence of a number of listings that were not mutually exclusive such as diesel fitter, fitter (diesel) and fitter. With the possible exception of this trade the data presented appears satisfactory.

CHAPTER 2.

ANALYTICAL FRAMEWORK

2.1 Discussion of the alternative forecasting procedures.[7]

A forecast may be defined as a statement concerning unknown future events. There are five approaches to making long range forecasts.

(a) The status quo approach
(b) The consensus approach
(c) The extrapolation approach
(d) The correlation and leading indicator approach, and
(e) The econometric modeling approach.

The *status quo approach* is based on the assumption that the future will be a continuation of the present. The accuracy of its results is accordingly dependent upon the validity of this extremely naive assumption.

The *consensus approach* involves the polling of various experts in a field to obtain their opinions as to the expected value of the target variable in any particular year. The obvious problem inherent in this approach is how to reconcile any conflicting opinions of the experts polled.

Extrapolation models of varying degrees of sophistication have been developed. Their basic characteristics are the restriction of the stochastic information available for extrapolation to the past history of the variable being studied, and the implicit assumption that

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7. The following discussion is based on R.H. Besdek's article, "The State of the Art - Long Range Economic and Manpower Forecasting", *Long Range Planning*, Volume 8, Number 1, February 1975, pp. 31-42.

past trends will continue into the future. The usefulness of such models is limited by the validity of these assumptions. They are, therefore, more suited to short period rather than long period forecasting.

Correlation and leading indicator approaches differ from extrapolation techniques in that they forecast on the basis of information obtained from other economic variables, rather than on the basis of information obtained from the history of the variable being forecast. Unless some basic underlying economic process is actually in operation, the possibility of the existence of spurious correlation limits the usefulness of these approaches.

Econometric modeling approaches employ systems of equations formulated on the basis of economic theory. Such models are regarded as offering the best hope for viable long range forecasting and their development has been greatly assisted by the increase in computer-sophistication in the past two decades. The greatest limitation of these models is their inability to yield estimates in sufficient detail for many purposes of long range economic and manpower forecasting. Their use for such purposes requires their integration with input output models; that is, the use of an economy wide econometric model to determine the aggregate economic and manpower variables, with an input-output submodel allowing analysis at the industry or occupation level.

The approach finally adopted was an input-output version of the extrapolation approach. This method was preferred because it was flexible enough to make use of the limited data available whilst still being sufficiently rigorous to be theoretically justifiable.

2.2. Stock-flow Model

The analysis was couched in terms of a stock flow model in which the projected supply of tradesmen in each year between 1978 and 1981 was compared with the expected future demand for tradesmen as derived from the survey returns.

The procedure adopted may be divided into six steps.

(1) The determination of the stock of tradesmen in each of the five trades at the starting point.

(2) The determination of whether an excess demand or an excess supply of tradesmen exists in each trade at the starting point.

(3) The projection from current enrolments of the number of apprentices expected to become qualified in each year up to June 30, 1981.

(4) The application of a wastage factor to the stock of tradesmen at the beginning of each period in order to determine the available supply at the end of that period, after allowing for projected apprenticeship completions.

(5) The determination of the expected future demand for tradesmen in each year up to June 30, 1981, and

(6) The determination of whether an excess demand or an excess supply of tradesmen is expected to exist in each of the four years up to June 30, 1981.

Stock of tradesmen at July 1, 1977

It was anticipated that the opening stock of tradesmen figure would be available from three alternative sources. Firstly, from the updating of existing statistical data. Secondly, by applying the formula:

$$\text{Number of tradesmen employed in the automotive industry} = \frac{\text{Number of apprentices employed in all firms}}{\text{Number of apprentices employed in firms surveyed}} \times \text{Number of tradesmen employed in firms surveyed.}$$

and thirdly, by polling a number of leading persons in the automotive industry and from their responses arriving at consensus estimates of the number of tradesmen in each trade.

Although the results for all three approaches are presented in Chapter 3, only the results for the last two methods are satisfactory. It was not possible to successfully update existing statistical information because

(1) the 1976 Census data giving a breakdown of population by highest qualification obtained will not be available until February 1978, and

(2) the classification of population by highest qualification used in the 1971 Census does not give a sufficiently detailed breakdown for the purpose of this study.

The determination of whether an excess demand or an excess supply of tradesmen exists at the starting point.

An examination of the registered unemployed and registered job vacancy figures with the Commonwealth Employment Service, over the period immediately prior to when the survey was taken, enables the demand and supply figures at this time to be derived from the employment of tradesmen figures. The relevant section of the survey questionnaire when restated on an industry basis, also provides a means of assessing the existing demand and supply conditions in each trade.

Projected apprenticeship completions

Expected apprenticeship completions may be determined by

applying time series techniques to past commencements and completions data. Unfortunately such an approach requires a long data series and since such a series was not available, this approach was not feasible.

Alternatively, completions to commencements ratios (C) may be determined from the data available and then applied to commencement figures for four years earlier in order to determine expected future completions. The realism of these calculations may be checked by referring to the number of apprentices currently in each year of training, and the expectations of the technical colleges and the Apprenticeship Commission with respect to the ability of these persons to complete their apprenticeship. This approach implicitly assumes that historically determined completions to commencements ratios will remain relevant in the future. This assumption although justifiable for purposes of short run forecasting may not be so for forecasts of longer duration.

Two factors must be taken account of explicitly in determining the C ratios. Firstly, the completions of any one year come largely from the commencements of four years earlier and secondly, the term of apprenticeship was decreased from five to four years on 29.6.71. In the determination of any C ratio it is therefore necessary to lag completions by four periods and also to make an allowance for the change in the period of indenture.

The completions:commencements ratios used in Chapter 3 of this dissertation were accordingly determined by the ratio of total completions between 1967-68 and 1976-77 to total commencements between 1962-63 and 1972-73. These ratios were then applied to the commencement figures in each trade between 1973-74 and 1976-77 to determine the

expected completions in each trade between 1977-78 and 1980-81.

The supply of tradesmen in each period

The supply of tradesmen in each period may be determined using the following formulae:

$$S_t = S_{t-1}(1-w) + C_{ot} \qquad (1)$$

$$C_{ot} = C_{t-4}(1-d) \qquad (2)$$

where S_t is the expected supply of tradesmen in a given trade in period t.

- S_{t-1} is the supply of tradesmen in the given trade in period t-1.

- w is the expected wastage rate.

- C_{ot} is the expected number of apprenticeship completions in the given trade in period t.

- C_{t-4} is the number of apprenticeship commencements in the given trade in period t-4.

and,

- d is the dropout rate of apprentices during training.

Equation (1) states that the supply of tradesmen in a given trade in period t is directly related to the apprenticeship completions in that trade in period t and the supply of tradesmen in period t-1, after appropriate adjustment has been made for wastage of tradesmen over the period.

Equation (2) states that expected apprenticeship completions in a given trade in period t are some direct proportion of commencements four periods earlier.

The expected future demand for tradesmen

No generally accepted technique exists for determining expected future demand. It was decided to use a direct approach and survey industry itself, then use these returns to determine aggregate expected future demand. It was in this context that the questionnaire outlined below was designed. The procedure adopted in administering the questionnaire was (1) to ascertain whether existing apprentices were expected to be maintained as tradesmen upon the completion of their apprenticeship (i.e., assuming 100% completions);

(2) to determine whether given these additional tradesmen the firm concerned felt that it would have sufficient tradesmen available to meet natural wastage and any anticipated expansion, and

(3) to adjust the figures obtained accordingly to determine the expected new tradesmen required.

The aggregate figures obtained through the survey thus give the expected number of tradesmen required by these firms to offset natural wastage and allow for any additional requirements. From the individual firm's point of view, "new" tradesmen refers to both apprenticeship completions and tradesmen obtained from other firms. From industry's point of view, "new" tradesmen refers only to apprenticeship completions because tradesmen obtained from another firm do not represent either a gain or loss to the industry.

The expected demand for tradesmen in a given trade in period t is thus D_t where

$$D_t = D_{t-1}(1-w) + A_{Tt} \qquad (3)$$

... D_{t-1} is the demand for tradesmen in the given trade in period t-1

... w is the expected wastage rate, and

A_{Tt} is the expected number of new tradesmen required by the industry in

period t (i.e., the number of tradesmen required to replace those who leave the trade and also to meet any additional requirements.)

Evaluation of the expected future conditions.

Two alternative techniques exist for evaluating the ability of the present apprenticeship system to provide the required flow of qualified tradesmen. Firstly, as the demand for each of the five trades being considered is not expected to decline in the next four years, the number of "new" tradesmen forthcoming must be sufficient to offset any wastage of the existing stock (i.e., maintain the status quo). Secondly, there must be sufficient new tradesmen forthcoming to meet the expected additional requirements of industry. These expected additional requirements must in some way be verified to ensure their relevance.[8]

2.3 The Survey

The major problem encountered in the course of preparing this dissertation was the lack of suitable statistical data available. The survey of firms in the industry thus constitutes an integral part of this dissertation. The questionnaire which is reproduced in full in Appendix A follows closely the six stages outlined above. It was specifically designed so that each question logically built on the former, thus giving both the interviewer and the interviewee continuity of thought and the opportunity to assess the position of each firm vis à vis its expected future demand for tradesmen. Additional questions were also included to enable the interviewee to express his opinion on

8. There may be sufficient apprenticeship completions to satisfy an overly pessimistic expected future demand by industry, but this would not stop an expost shortage from occurring. The converse is also true, thus industry's estimates must in some way be verified. The naive "status quo" calculations form the first step in this process.

(1) the cause of the industry's present problems,

(2) the effectiveness of government in dealing with these problems, ar

(3) the alternative solutions available.

CHAPTER 3.

PRESENTATION OF RESULTS AND CALCULATIONS.

3.1. Stock-flow model incorporating survey data

Stock of tradesmen at July 1, 1977

Reliable figures for the opening stock of tradesmen in each trade proved extremely difficult to obtain because they were not available from any existing source. The 1976 Census data[9] would have provided a satisfactory starting point however the breakdown of qualifications by trade data will not be available until February 1978, and only then in the form of a fifty percent sample.

It was decided to update the 1971 Census figures. The classification system used at this time did not give a sufficiently detailed breakdown of qualifications by trade, thus despite five computer runs the best figures obtainable were:

Automotive Electricians	Diesel Mechanics	Motor Mechanics	Panel Beaters	Vehicle Painters
14	-	887	1	-

Although these figures were clearly unsatisfactory it was decided to update the automotive electrician and motor mechanic figures as reference points for the other estimates. The wastage rate suggested[10] in work of this kind and the rate applied throughout this study, is

9. It must be realized that census data only gives a breakdown of the population by highest qualification obtained. It therefore only gives the potential supply of qualified tradesmen. The number of persons actually using their trade qualifications is likely to be far less.

10. The usual procedure adopted is to decide upon a plausible, expected rate which is then used for all calculations. If the results of the calculations are found to differ significantly when different rates are applied then note is made of this fact. A 5% per annum wastage rate was used in the "Report of the Fact Finding Committee on the Apprenticeship System in the Building Trade", Western Australian Government Printer, March 1962.

5% per annum. This rate is consistent with the survey findings.[11]

Automotive Electricians		S_{t-1}	$1 - w$	C_{ot}		S_t
Stock June 30 1972	=	14	(1 - .05)	+ 3	=	16
Stock June 30 1973	=	16	(1 - .05)	+ 11	=	26
Stock June 30 1974	=	26	(1 - .05)	+ 2	=	27
Stock June 30 1975	=	27	(1 - .05)	+ 7	=	33
Stock June 30 1976	=	33	(1 - .05)	+ 10	=	41
Stock June 30 1977	=	41	(1 - .05)	+ 13	=	53
Motor Mechanics						
Stock June 30 1972	=	887	(1 - .05)	+ 75	=	918
Stock June 30 1973	=	918	(1 - .05)	+ 81	=	953
Stock June 30 1974	=	953	(1 - .05)	+ 72	=	977
Stock June 30 1975	=	977	(1 - .05)	+ 87	=	1015
Stock June 30 1976	=	1015	(1 - .05)	+ 136	=	1100
Stock June 30 1977	=	1100	(1 - .05)	+ 86	=	1131

In the course of conducting this study a total of 81 firms were personally surveyed.[12] Several of these firms offered to obtain statewide figures from their associated companies thus the final coverage of the survey was in excess of 100 firms comprising approximately 60% of the industry. The firms interviewed employed a total of 911

11. From the survey 38 persons interviewed did not regard the leakage of tradesmen from their trade as being significant, 34 persons did, and 9 did not know. Conservatively it appeared that 160 tradesmen had left their trade in the previous five years. Based on the current employment estimates in the automotive industry (table 3c.) the wastage rate for motor mechanics between 1972 and 1977 was 5.1% per annum while the wastage rates in the other four trades were concentrated around 4.5% per annum.

12. Discussions with members of the Commonwealth Department of Employment and Industrial Relations suggested that a response rate of between 20-30% could be expected on written requests for information, hence the necessity for the interview approach.

tradesmen and 437 apprentices in the five trades under consideration (refer Tables 3a. and 3b. below). Of the tradesmen employed 130 were in management or supervisory positions requiring trade qualifications (e.g., Service Manager, Service Advisor and Workshop Foreman).

TABLE 3a. Current Employmentof Tradesmen in the Firms Surveyed (30.9.1977)

Automotive Electricians	69
Diesel Mechanics	69
Motor Mechanics	499
Panel Beaters	167
Vehicle Painters	107
	911

TABLE 3b. Current Employment of Apprentices in the Firms Surveyed (30.9.1977)

Trade	Yr.1	Yr.2	Yr.3	Yr.4	Total
Automotive Electricians	7	8	7	8	30
Diesel Mechanics	10	10	11	9	40
Motor Mechanics	61	68	62	59	250
Panel Beaters	18	23	24	9	74
Vehicle Painters	13	14	9	7	43
	109	123	113	92	437

The information presented in Tables 3a. and 3b. enabled the formula -

$$\frac{\text{Number of apprentices in all firms}}{\text{Number of apprentices in firms surveyed}} \times \text{Number of tradesmen employed in firms surveyed} \div \text{Number of tradesmen employed in the automotive industry.}$$

to be applied with the results given in Table 3c.

The final option of polling a number of leading persons in the automotive industry and from their responses arriving at consensus estimates for the number of tradesmen in each trade yielded the results presented in Table 3d. below. Although based on less than full information and biased by the particular segment of the industry with which

TABLE 3c. Estimates of the number of Tradesmen employed in the Automotive Industry, based on the assumption of a representative sample (30.9.1977).

Trade	(1) No. of tradesmen employed in Firms Surveyed.	(2) No. of apprentices employed in Firms Surveyed.	(3) Total Apprentices employed in Tasmania.	(4) Inverse of the estimate of trade coverage (3)÷(2)	(5) Est.No. of tradesmen employed in the automotive industry (1) x (4)
Automotive Electricians	69	30	33	1.10	76
Diesel Mechanics	69	40	137	3.43	236
Motor Mechanics	499	250	421	1.68	840
Panel Beaters	167	74	118	1.59	266
Vehicle Painters	107	43	69	1.60	172
TOTAL	911	437	778		1590

TABLE 3d.

Consensus Estimates of the Number of Tradesmen in Each Trade. (30.9.1977)

Automotive Electricians	80 - 100
Diesel Mechanics	200 - 250
Motor Mechanics	850 -1000
Panel Beaters	300 - 400
Vehicle Painters	150 - 240

the respondent is most familiar, these estimates are very close to those derived from the survey data. They also suggest that the updated census data is incorrect, as was expected. The figures presented in Table 3c were therefore adopted as the starting point for the demand and supply calculations.

The determination of whether an excess demand or an excess supply of tradesmen exists at September 30, 1977.

The registered unemployed and registered vacancies information required was not available in sufficient detail through normal sources. The Commonwealth Department of Employment and Industrial Relations kindly consented to make a statewide check of their individual registers to ensure that the breakdown of their records by trade was consistent with the classification used in this study. The results of this check are presented in Table 3e.

TABLE 3e. Statewide Check of C.E.S. Registers 30.9.1977

Qualified Tradesmen

	Registered Unemployed	Registered Vacancies
Automotive Electrician	1	2
Diesel Mechanic	3	8
Motor Mechanic	12	12
Panel Beater	2	10
Vehille Painter	1	1
	19	33

From the survey, 62 firms stated that their present workforce was sufficient to meet their current requirements, 14 firms stated that it was not and 5 firms stated that they were overstaffed. The number of vacancies and overstaffings cancelled out with respect to automotive electricians and diesel mechanics but in the motor mechanic, panel beating and vehicle painting trades there were excess vacancies of 4, 4 and 3 respectively. As the survey coverage in these three trades was approximately 60%, the equivalent net shortages on an industry basis are 7, 7 and 5. These figures represent a fairly conservative estimate of the present shortage of tradesmen in the trades covered.

From the workforce size estimates (Table 3c.) and the registered unemployed figures (Table 3e.) the supply of tradesmen in each trade at September 30, 1977, may be determined. Similarly the corresponding demand figures may be obtained by adjusting the workforce size estimates for registered vacancies, and then applying the survey based differences between demand and supply as a check, making adjustments as required. The results of these calculations are presented in Table 3f. below.

TABLE 3f. Estimated market Situation at September 30, 1977.

	Demand	Supply
Automotive Electrician	78	77
Diesel Mechanic	244	239
Motor Mechanic	859	852
Panel Beater	276	268
Vehicle Painter	180	173

Projected apprenticeship completions

A sufficiently long data series did not exist to allow the use of a time series approach to the projection of apprenticeship completions. Completions to commencements ratios were therefore calculated for each trade and then applied to the commencements figures between 1973-74 and 1976-77. The results of these calculations are presented in Table 3h. The C ratio for each trade was determined by dividing total completions for the period 1967-68 to 1976-77 by total commencements for the period 1962-63 to 1972-73. These calculations are shown in Table 3g.

The plausibility of the expected apprenticeship completion figures, presented in Table 3h., was confirmed by those persons at the Apprenticeship Commission and the Hobart Technical College to whom they were shown. They are also plausible from the

TABLE 3g Calculation of Completions to Commencements Ratios

	(1) Total Completions 1967-68 to 1976-77.	(2) Total Commencements 1962-63 to 1972-73	(3) Completions to Commencements Ratios (1) ÷ (2)
Automotive Electrician	69	80	.863
Fitter (Diesel)	204	229	.891
Motor Mechanic	870	1088	.800
Panel Beater	209	295	.708
Vehicle Painter	126	179	.704

TABLE 3h Expected Apprenticeship Completions at the Above Completions to Commencements Ratios

	1977-78	1978-79	1979-80	1980-81	TOTAL 1977-78 to 1980-1981
Automotive Electrician	11	10	9	7	37
Fitter (Diesel)	44	30	37	31	142
Motor Mechanic	111	93	98	105	407
Panel Beater	28	28	28	26	110
Vehicle Painter	22	13	17	16	68
	216	174	189	185	764

point of view of current technical college enrolments (Refer Appendix D).

The supply of tradesmen in each period

Given the estimated stock of tradesmen in each trade at September 30, 1977(Table 3f.) and the projected apprenticeship completions for the next four years (Table 3h.) it is possible to calculate the expected supply of tradesmen in each year up to June 30, 1981. The results of these calculations are presented in Table 3i.

TABLE 31. Expected Future Supply of Tradesmen

TRADE	Year	S_{t-1}	1 - w	Projected Apprentice-ship comple-tions	Expected Future Supply
Automotive Electrician	1978	77	.9625	(.75) 11	82
	1979		.95	10	88
	1980		.95	9	93
	1981		.95	7	95
Deisel Mechanic	1978	239	.9625	(.75) 44	263
	1979		.95	30	280
	1980		.95	37	303
	1981		.95	31	319
Motor Mechanic	1978	852	.9625	(.75)111	903
	1979		.95	93	951
	1980		.95	98	1001
	1981		.95	105	1056
Panel Beater	1978	268	.9625	(.75) 28	279
	1979		.95	28	293
	1980		.95	28	306
	1981		.95	26	317
Vehicle Painter	1978	173	.9625	(.75) 22	183
	1979		.95	13	183
	1980		.95	17	195
	1981		.95	16	201.

As the starting point for the future supply calculations was not July 1, 1977, as initially intended, two adjustments are required to the 1978 supply calculations in each trade. Firstly, the expected wastage rate must be adjusted from a yearly rate of 5% to a nine monthly rate of 3.75% and, secondly, the expected completions in 1977-78 must be adjusted to allow for apprenticeship completions in the three months, June 30 to September 30, 1977.

The appropriate formulae for the expected future supply calculations are those outlined in Chapter 2 namely,

$$S_t = S_{t-1}(1 - w) + C_{ot} \qquad (1)$$

$$C_{ot} = C_{t-4}(1 - d) \qquad (2)$$

The diesel mechanic calculations implicitly assume that all fitter (diesel) completions will become diesel mechanics.

The expected future demand for tradesmen

In order to determine the expected new[13] tradesmen required in each year up to June 30, 1981, the firms surveyed were firstly asked whether, given a 100% completion of apprenticeships, they expected to employ all current apprentices when these persons became qualified. In the majority of cases the answer to this question was "yes". Firms were then asked whether given these additional tradesmen their workforce would be sufficient to meet any planned expansion, plus allow for wastage of existing tradesmen at the normal rate[14] for that firm. Where the response was either "less than sufficient" or "more than sufficient"

13. Recall that from the individual firm's point of view, "new" tradesmen refers to both apprenticeship completions and tradesmen obtained from other firms, whereas from industry's point of view it refers only to apprenticeship completions.

14. Although the wastage rate for the industry as a whole was found to be approximately 5% per annum, the relevant rate for any given firm is the rate determined from its own past experience.

an increasing or decreasing adjusting entry was made accordingly. The aggregate results of this process are given in Table 3j below. The figures therein allow for wastage of the intial stock at an average rate of 5% per annum.

TABLE 3j. Expected New Tradesmen Required in the Firms Surveyed

Year.	A.E.	D.M.	M.M.	P.B.	V.P.	TOTAL
1978	10	8	79	28	16	141
1979	8	13	67	24	10	122
1980	8	11	68	24	13	124
1981	7	12	63	20	14	116
	33	44	277	96	53	503

Three adjustments are required to the expected new tradesmen figures (presented in Table 3j) in order to determine the expected future demand for tradesmen. Firstly, they must be adjusted to an industry wide basis. Secondly, they must be adjusted to account for the demand for tradesmen already employed, and thirdly, the demand for tradesmen already employed must be adjusted to allow for the expected wastage of these tradesmen. The relevant formulae are

$$D_t = D_{t-1}(1 - w) + A_{Tt} \qquad (3)$$

$$A_{Tt} = A_{St}\, I \qquad (4)$$

where ... D_t is the expected demand for tradesmen in a given trade in period t.

... D_{t-1} is the demand for tradesmen in the given trade in period t-1.

... w is the expected wastage rate

... A_{Tt} is the estimated number of new tradesmen required in the given trade in period t (i.e., the number of tradesmen required to replace those tradesmen who leave the trade and also to meet any additional requirements).

... A_{St} is the additional number of new tradesmen required in a given trade in period t, in the firms surveyed, and

TABLE 3k Expected Future Demand for Tradesmen

TRADE	Year	D_{t-1}	I - w	A_s	I	Expected Future Demand
Automotive Electrician	1978	78	.9625	10	1.1	86
	1979	86	.95	8	1.1	91
	1980	91	.95	8	1.1	95
	1981	95	.95	7	1.1	98
Diesel Mechanic	1978	244	.9625	8	3.43	262
	1979	262	.95	13	3.43	293
	1980	293	.95	11	3.43	316
	1981	316	.95	12	3.43	341
Motor Mechanic	1978	859	.9625	79	1.68	960
	1979	960	.95	67	1.68	1025
	1980	1025	.95	68	1.68	1088
	1981	1088	.95	63	1.68	1139
Panel Beater	1978	276	.9625	28	1.59	310
	1979	310	.95	24	1.59	333
	1980	333	.95	24	1.59	355
	1981	355	.95	20	1.59	369
Vehicle Painter	1978	180	.9625	16	1.60	199
	1979	199	.95	10	1.60	205
	1980	205	.95	13	1.60	216
	1981	216	.95	14	1.60	228

... I is the inverse ratio of trade coverage.

In the case of expected demand in 1978 it is necessary to make an additional adjustment, namely the conversion of the expected yearly wastage rate of 5% to the appropriate nine monthly rate of 3.75%. No adjustment is required to the new tradesmen required figures as this was explicitly adjusted when conducting the survey.

Evaluation of the expected future conditions

In order to maintain the status quo at an expected wastage rate of five per cent per annum four automotive electrician, twelve diesel mechanic, forty-three motor mechanic, thirteen panel beater, and nine vehicle painter apprentices must complete their time each year. When compared with the expected apprenticeship completion figures in Table 3h. it appears that these targets will be fairly easily met over the next four years. Provided the expost wastage rate does not rise above ten percent none of these trades should be seriously threatened from a "status quo" point of view. However, if we restate expected apprentice intake figures (Table 31) on an industry basis (Table 3m) and project apprenticeship completions between 1981-82 and 1984-85 (Table 3n) the expected situation over this period is nowhere near as healthy. An expost wastage rate of 9% per annum would lead to reductions in the stock of qualified motor mechanics, panel beaters and vehicle painters.

TABLE 31. Expected Intake of Apprentices in Firms Surveyed

	1978	1979	1980	1981	TOTAL
Automotive Electrician	6	9	10	6	31
Diesel Mechanic	6	10	10	9	35
Motor Mechanic	53	56	59	60	228
Panel Beater	15	19	20	16	70
Vehicle Painter	10	11	14	15	50
	90	105	113	106	414

TABLE 3m. Expected Intake of Apprentices in all Firms

	1978	1979	1980	1981	TOTAL
Automotive Electrician	7	10	11	7	35
Diesel Mechanic	21	34	34	31	120
Motor Mechanic	89	94	99	101	383
Panel Beater	24	30	32	25	111
Vehicle Painter	16	18	22	24	80
	157	186	198	188	729

TABLE 3n. Expected Apprenticeship Completions

	1981-82	1982-83	1983-84	1984-85	TOTAL
Automotive Electrician	6	9	9	6	30
Diesel Mechanic	19	30	30	28	107
Motor Mechanic	71	75	79	81	306
Panel Beater	17	21	23	18	79
Vehicle Painter	11	13	15	17	56
	124	148	156	150	578

As stated earlier the status quo approach is extremely limited in its applicability because of the very naive (i.e., no change) assumption upon which it is based. Also, in the above cases, what would in fact be maintained is the present undersupply situation. The status quo estimates were also more sensitive to changes in the wastage rate or the initial stock of tradesmen, than the expected demand and supply estimates, discussed below. They did however serve their intended purpose of presenting the minimum future requirements. In addition they helped to show the problems which the potentially low apprentice intake over the next four years, if realized, would cause.

The expected future demand and supply estimates presented in Tables 3k and 3i respectively show how the existing excess demand

for tradesmen will worsen rather than improve over the next four years. This is despite the fact that the demand estimates obtained through the survey appear conservative, with few firms contemplating expansion.

The worst affected trades are those of motor mechanic, panel beater and vehicle painter where the shortages of tradesmen over the next four years are expected to increase by 76, 44 and 20 respectively. The automotive electrician category appears least affected showing only a slight deterioration over the period. The magnitude of the problem faced by the panel beating and vehicle painting trades can be more fully appreciated if expected apprenticeship completions between 1981-82 and 1984-85 are considered. Assuming a five percent wastage rate, but *no* increase in demand, these trades would still have shortages of 25 and 7 respectively at June 30, 1985.

CHAPTER 4.

AN EXAMINATION OF THE RESULTS, THE LIMITATIONS THEREIN AND SUGGESTIONS FOR FURTHER STUDY.

4.1 Limitations in the data and methodology

As already noted the major problem encountered in the preparation of this dissertation was the non-existence of much of the required statistical data. In addition what was available tended to be fragmented and generally of poor quality. Although not an initial aim of this dissertation, the compilation of an improved stock of data on the automotive industry became a vital pre-requisite for any subsequent analysis.

To the extent that the survey undertaken may not be representative of the employment of tradesmen in the five trades covered, the data compiled and the analysis based thereon must suffer accordingly. A computer run undertaken by the Research Branch of the Education Department, and based on 1974 figures, suggested that 66.8% of apprentice employers in the automotive industry employed five or less apprentices, 12.4% employed six to ten apprentices, 1.4% employed eleven to twenty apprentices and 19.4% employed twenty one or more apprentices.

When only those firms who employed apprentices were considered the survey data suggested that 73.2% of employers in the automotive industry employed five or less apprentices, 11.3% employed six to ten apprentices, 7.0% employed eleven to twenty apprentices and 8.5% employed twenty one or more apprentices. This result suggests that (1) the sample is unbiased (at least with respect to its coverage of

firms who employ apprentices), and

(2) that the assertion made about the change in the industrial structure, towards smaller firms, is correct.

Despite this, the projected industry results for diesel mechanics and motor mechanics may still be biased. In the case of diesel mechanics a bias may have arisen due to the lack of a generally accepted meaning of the term in industry. The results in this category may therefore be either over or under-stated, the direction of the error being most probably an over-statement but there is no way of being sure. In the case of motor mechanics the sample based estimate of the number of tradesmen employed may be understated. An under-statement in this trade could have arisen because in an attempt to obtain a high coverage of apprentice employers the survey was biased away from the multitude of service-stations and backyard operators. An increased coverage of service-stations in any future survey would be possible although very time consuming. The problem of tracing backyard operators would again result in their exclusion. From a statistical point of view this may not be a major problem because most of these persons are either unqualified or, if qualified, hold down a regular job as well. From an industry point of view tradesmen working for themselves part-time and unqualified substitutes do however present a serious problem. It is ironical that tradesmen endeavouring to improve their economic lot by working at home after hours may, in the aggregate, be damaging the industry from which they obtain the security of full-time employment.

Although this survey may be biased in favour of firms who employ apprentices such a bias is justifiable *if* one adopts the view that the government should help those who do most to help themselves. As a

value judgement it appears inequitous that the costs associated with the training of apprentices should be borne by one segment of the industry when it is the industry as a whole, and indeed society itself, which benefits most through their training.

A further limitation in the approach adopted involves the heavy use of what may be described as "historically based ratio analysis". The defence of this approach is that in applying economic techniques to a practical problem, it is necessary to make the best use of the information available. If the information available does not readily lend itself to econometric modelling then an alternative approach must be found. Such has been the case in this study.

4.2. A discussion of the undersupply problem based on the survey data. The determinants of the demand for tradesmen

The factors believed to determine the employment opportunities for tradesmen were found to vary both between firms and also between trades. However, a general belief did exist that work volume,[15] quality of the tradesman himself and the lack of incentive for business to expand were the major limiting factors.

Work volume was the most oft cited determinant, and contrary to expectations wage costs were not given as the major factor determining work volume. There is a general belief in industry that the good tradesman is *underpaid* in relation to his skill, and also a general dissatisfaction with the union stance whereby it is virtually impossible to discriminate between a good and a bad tradesman.[16] Over award payments

15. "Work volume" refers to the amount of retail and warranty work available for firms in the industry. As the volume of warranty work is fairly constant, "work volume" varies directly with the volume of retail work available.

16. This is not the only area of discontent as the recent press statements, concerning the unionization of apprentices, indicate.

for one must be matched by over award payments for all.

The problem with respect to work volume lies in the lack of protection for tradesmen and reputable firms who are being prostituted from outside the industry. The typical comment made was that

> "it is illegal to do your own plumbing or wire the electrical system on your home and yet anyone can work on their own, or someone else's car, thus creating a far greater risk of injury or death."

The fact that the large firms must undertake considerable capital expenditure in order to provide a quality of service and the capacity to do major repairs is overlooked by the average motorist who patronises his local service-station or does the job himself when a regular service is due. A survey conducted by a major franchised dealer of 100 "regular" customers who had not been in for a service for two or more months revealed that although customers had been satisfied with the quality of service given, while their car was under warranty, they were now taking the car to the local service station because it was more convenient and cheaper to do so. These customers were quick to add that they would not hesitate to bring the car back if anything major went wrong.

The problem, restated, is how to reconcile quality and capacity of service with the final labour rate charged per hour. The mark up on prime labour cost[17] of between 240% and 350% may be justifiable in terms of overhead costs and the quality of the services provided but how can the consuming public be made to see this ?

The panel beating and vehicle painting trades are faced with

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17. Prime labour cost per hour equals $\frac{\text{weekly wage paid}}{\text{number of hours worked}}$, with *no* allowance being made for holiday pay, holiday loadings, payroll tax, idle ("shop") time, workers' compensation, overalls, and other items provided, supervisors and clerical staff's wages.

an additional problem, namely Insurance Company dominance of the industry whereby a standard rate of $10 per hour is allowed on all insurance claim work.[18] Further, the lowest of three quotes system works against the larger and more reputable firms, who maintain that it is inconsistent of the Insurance Companies to police price without also policing quality. The larger bodyworks thus tend to be left with the larger smash repairs, which the smaller concerns do not have the equipment or expertise to handle, while the smaller bodyworks and back-yard operators take the pick of the fast turnover jobs in the 0-$500 range. As a direct result of this work allocation the larger bodyworks are often faced with serious liquidity problems. This is due to several months delay on the arrival of parts, several months work when the parts do arrive and then an average delay of three months between completion of the job and final settlement by the Insurance Company. The system is ironical in that the customer, who the Insurance Companies are endeavouring to protect, is in most cases the loser. He suffers both from the point of view of the time taken before handing his car over to a bodyworks for repair and also from the quality of the job finally done.[19]

The automotive electrician is perhaps the least affected tradesman from the point of view of "non qualified substitutes". This is because he is providing a necessary specialist service which cannot easily be mastered. The greater fluctuations in work volume in this trade severely limit the size of operations. This is also the case

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18. This represents a markup on prime labour cost of approximately 150% for firms paying the minimum award wage, and a markup of between 80 and 120% for most firms in the industry.

19. Most bodyworks stated (with regret) that all too often the quality of a job was determined by the margin in the quote.

in the panel beating and vehicle painting trades.

The quality and initiative of the individual tradesman was often cited as the major factor determining his employment prospects. As stated earlier the tradesman of today is relatively underpaid hence many tradesmen apply themselves with less dedication and are less willing to accept responsibility.[20]

The final major limiting factor was seen as being the lack of incentive for business to take risks, expand and thus offer additional employment. The expected value of the discounted future cash flows is not sufficient to compensate for the increased variability of the net earning stream, or in the words of the respondents: "What we get after everyone else takes their share is not enough to make it worthwhile". This problem is particularly worrying in an economy like Tasmania which is built on private ownership and small business. Even most of the large franchised dealerships are privately owned family concerns. A problem which may eventuate on the death, or retirement, of the present owner-managers, is the closing down or sale of these firms because the relatives who assume control do not regard the return which they offer as being sufficient. If this happens then the stability of employment in the industry will be adversely affected. The appropriate solution to the insufficient rate of return problem appears to require a review of the present taxation system, including the adoption of current value accounting for taxation purposes, in order to ensure that only real profits are taxed.

The determinants of the demand for apprentices

A significant finding of the survey was that firms in general

20. Although having obvious economic connotations with respect to the quality of the workforce, this is perhaps best regarded as a social problem and treated accordingly.

do not regard apprentices as being in any way substitutes for tradesmen. Apart from the occasional comment that "a good apprentice is better than a bad tradesman", apprentices tend to be regarded as a necessary evil; necessary in that they represent the future stock of tradesmen and an evil in that they are more a burden than an asset especially in the early years of training.[21] Apart from the costs associated directly with the apprentice, there is the problem of having to provide almost constant supervision of his work by a qualified tradesman. The cost to the firm (both in the form of the tradesman's wages and also earnings foregone) of providing this supervision is perhaps the biggest single limiting factor on apprentice intake. If the trend away from larger firms continues and the smaller firms continue to find it unprofitable to employ apprentices, then the under supply of tradesmen which exists at present will be aggravated, rather than corrected, in the future. The expected future intake of apprentices (Table 3m.) verifies the concern shown by the Apprenticeship Commission and the technical colleges, who expect 1978 to be a very bad year for prospective apprentices. A low expected intake in 1977 was averted when a number of smaller employers who had never previously taken on apprentices were enticed to do so by (1) the state government saying that it would only give contracts to those employers who employed apprentices, and

(2) the increased level of assistance obtainable through the Commonwealth Rebate for Apprentice Full-time Training (CRAFT) and National Employment and Training (NEAT) schemes.

Apart from the above mentioned problems of the amount of

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21. Although varying between apprentices and firms, apprentice vehicle painters begin to show a return by the end of first year, apprentice automotive electricians midway through second year, apprentice panel beaters by the end of second year and apprentice diesel and motor mechanics midway through third year.

supervision required and the failure to "pay their way" in the early years of training apprentices are generally worse off than tradesmen because they represent the first buffer in times of economic hardship.[22] Their employability is thus squeezed from both below and above. From below they meet increased competition from non-apprenticed youth who cost less to employ, are available for a full five days per week and may be shifted from one job to another within the firms as workload requires without offending apprenticeship or union authorities. From above, apprentices meet increased competition from tradesmen themself. When the wage differential between a third year apprentice and fully qualified tradesman is only $35 to $40 per week, it is understandable why many firms prefer to employ the tradesman.

As was the case with respect to tradesmen, quality and attitude of the individual play an extremely important role. Just as the good tradesman will always find work, so too will the good apprentice. Industry's major concern in this regard is that the number of suitable applicants has declined in proportion to the total number of persons seeking apprenticeships. It is indeed an indictment of the present education system when the service managers of major franchise dealerships can, with some justification, say that "many school certificates are not worth the paper they are printed on".[23] The reaction of the franchised dealers to this situation resulted in their collective

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22. David Farber argues that policies which strengthen the apprenticeship system in downturns will pay significant dividends to the economy as a whole, and the individuals concerned, in latter years. The problem involves convincing industry to look beyond the present.
Farber, D. "Apprenticeship in a Changing Economy", *Apprenticeship News*, Number 40. September 1975, pp. 126-129.

23. Although distasteful this statement is not without some substantiating evidence. Refer: Welch, P., "A Report on the Standard of Mathematics of Stage 1 Trade Apprentices on entry to the Hobart Technical College. Unpublished Report, Hobart Technical College, 1975.

screening of 180 applicants for 30 apprenticeship vacancies in the motor trade in Hobart last year. The system proved successful and has been retained for 1977-78 with the Commonwealth Employment Service doing the screening on their behalf.[24] A similar system has also been adopted by franchised dealers in the Launceston area.

A comparison of the present employment situation with that of five years ago.

On the question of assessing the employment prospects for tradesmen and apprentices today, vis à vis five years ago, opinion was evenly divided with respect to tradesmen and substantially in agreement with respect to apprentices. Twenty-seven respondents said that it was now easier for tradesmen to secure employment, twenty-nine said it was now harder, twenty-one thought that it was about the same, and four did not know. Sixty-five respondents said that it was now harder for a person to secure an apprenticeship, eleven said it was about the same, one said it was now easier and four did not know. Those respondents answering "harder" and "easier" for tradesmen were not necessarily giving inconsistent answers when their reasoning in each case is examined. Those who answered "harder" did so, in many cases, based on their knowledge of how the larger firms have been forced to cut back on their employment of tradesmen in the past five years. Those who answered "easier", did so in the belief that a shortage of good tradesmen still exists and consequently, regardless of the size of the employing firm, a good tradesman has little trouble in securing employment.

The best job prospects for tradesmen today appear to be in specialist areas such as automotic transmission servicing, emission control testing and tuning, brake relining, wheel aligning and working

24. Refer the advertisement published in *The Mercury*, 29.10.77 and 5.11.77 which is reproduced in Appendix E.

on imported vehicles; these areas being less affected by any deterioration in general economic conditions, or competition from non qualified substitutes. The prospects for internal advancement to supervisory or lower management positions are also better now, with many positions at this level requiring trade knowledge. As already stated the biggest potential threat comes from the mushrooming of backyard and small operations, many of whom do not employ qualified tradesmen. At present however these establishments are not seriously affecting the employment of tradesmen in the aggregate. They are in fact helping to moderate the excess demand for tradesmen. The recent increase in the number of smaller firms would have to be accepted as an efficient, market based, change if (1) the quality of service which they provided was not in doubt,

(2) they were willing and able to do larger jobs as well as smaller ones, and,

(3) they were as capable of training apprentices as the larger firms whose survival they threaten.

Leaving the questions of quality and capacity of service aside, the trend towards smaller firms is of questionable benefit because of its affect on the future supply of tradesmen (i.e., current and prospective apprentices). Less work for the larger firms means that they cutback on their employment of tradesmen and apprentices; the reduction in apprentices being more than proportionate to the reduction in their workload. The displaced tradesmen are readily re-employed with smaller firms who are not capable, or willing, to bear the apprentice adjustment as well.

The high levels of youth unemployment in general further hampers the genuine attempts to obtain an apprenticeship. Many young people

now offer themselves for apprenticeships in trades in which they have little or no interest. They do so merely in an attempt to obtain employment. This "satisficing policy"[25] on behalf of job applicants is frustrating to employers who are looking to train their future tradesmen. It also partly explains industry comments of

- "Their attitude is now worse and they are more careless."
- "They lack discipline."
- "Their motivation is low and they show no interest in their schooling."
- "They may be little angels during their three month probation period but once they know you have got them for four years ..."
- "Most of them have no intention to stay in the trade and let you know it."
- "It's the parents, the schooling, and the welfare state that's to blame. Apprentices nowadays have no incentive to make a go of a job."

Firms realize that in the end they only have themselves to blame if they select an apprentice who does not come up to expectations. They therefore adopt a "once bitten twice shy" attitude, which when combined with the high direct and indirect costs of training an apprentice and the deterioration in the competitive position of the larger firms, explains the low expected apprentice intake figures.

The effectiveness of government initiatives.

When asked, "to what extent is your employment of apprentices influenced by the generosity or otherwise of government allowances and incentives?" only 8 firms answered that it had much effect. A further 27 firms said that it was a help, 41 firms said that it had absolutely no effect at all and the remaining 5 firms were either undecided or did

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25. There is evidence of many young people conforming to parential and societal pressure to "have a go" and get a job; any job. Many parents regard trades as being something which you can fall back on if times get hard. They therefore push their children into this area, *not* as a preferred, or intended career, rather as a safeguard for the future.

not wish to comment. Of the 41 firms who said that it had absolutely no effect at all, 3 firms further stated that they did not even claim. Typical comments made were that:

- "It is company policy (i.e., moral rather than economic grounds) to continue to employ apprentices."
- "It is no good the government paying part of the apprentice's wages if there is no work available to pay the other part."
- "It costs $3,000 plus to employ a first year apprentice, therefore a rebate of $11/day for each day of technical training is but a drop in the ocean."
- "The trouble you have to go to (i.e., too much paperwork and too long a delay in receiving payment) makes it hardly worthwhile claiming."

The policy implication of the above finding is to question seriously the efficacy of the traditional subsidy approach. Firms were not reticent in offering suggestions for improvement and some of the more feasible alternatives are discussed in Chapter 5.

4.3. Suggestions for Further Study

At the risk of pre-empting the conclusions and recommendations of this study, further research is required into the service side of the automotive industry itself. In particular (1) *The effect which the smaller firms and backyard operators are having on the industry.* Can the 240-350% markup on prime labour cost adopted by the larger firms be justified in terms of superior quality, and capacity of service? If so, how can the general public be made to accept this? Should they have to accept it?

(2) *The effect which Insurance Companies are having on the panel beating and vehicle painting side of the industry.* Is the present system of policing price, and not quality, an efficient and equitable allocator of work volume?

(3) *The future of the apprenticeship system as it exists at present.* If the average size of firms in the industry, and hence their ability and willingness to employ apprentices, continues to decrease will it be necessary for the government to intervene and provide full time training for the first two years of the apprenticeship, at which time firms could select from semi-trained "apprentices"? Would such a scheme succeed, or would it meet a similar fate to present initiatives? Should the government accept responsibility for implementing and administering such a scheme or should the industry be left to regulate itself?

(4) *An examination of the foundations on which payroll tax is based, and an assessment of the present system in relation to the current high levels of unemployment in the economy as a whole.* Would the abolition of payroll tax and the associated drop in state government revenue be more than offset by any decrease in the total payout of social service benefits? If so, how could the Commonwealth cost saving be passed on to the state which suffers the loss of revenue? Do sufficient moral grounds exist for the abolition, or restructuring, of payroll tax? and,

(5) *A cost benefit study of the feasibility of introducing a form of compulsory vehicle roadworthiness testing.* Would such a scheme enable quality as well as price to be regulated effectively in the market place?

CHAPTER 5.

CONCLUSIONS AND RECOMMENDATIONS

5.1 A Note on Problem Solving

As any good tradesman will verify the only satisfactory way to solve a problem is to correctly diagnose what component is actually causing the problem and replace or repair the part concerned. The overhauling of the motor of a car which will not start is of little value if it were only the battery which required attention, or if the car had run out of petrol. Likewise the process of adding a pint of oil to the car's engine every second day is at best a short term solution which momentarily forestalls the inevitable major repairs. In each case what is required is the application of previously acquired skills to go beyond the surface manifestations of the problem to analyse the situation, diagnose the actual cause, list and evaluate the alternative corrective measures and then act accordingly, being prepared to repeat the process should the steps taken fail to satisfactorily resolve the problem.

5.2 A Summary of the Facts

The first implication of the above to the topic in hand is the need to go beyond the actual shortage of tradesmen and the deficient demand for apprentices in order to get to the core of the problem and devise some way of breaking the circularity which perpetuates the under-supply.

The pertinent facts, and the reasons for the expected future shortage of tradesmen are:

(1) Due to relatively low wages and poor working conditions a shortage of tradesmen in the automotive industry has existed for some time.

(2) Past attempts to correct this imbalance have been largely unsuccessful because they have been made on an individual firm, rather than an industry, basis. There is now a general recognition, at least among the larger firms, that it is not a satisfactory long run policy to ensure that your present workforce is sufficient regardless of how other firms are situated. Their shortage today may well be yours tomorrow.

(3) The possible ways of averting any future shortage of tradesmen involve (a) increasing the wages and improving the working conditions within the industry, thus encouraging more tradesmen to stay in their trade[26] (i.e., decrease the wastage rate).

(b) increasing the apprentice intake, or

(c) recruiting tradesmen directly from outside Tasmania.

(4) Methods (a) and (c) have been used in the past with only limited success,[27] and method (b) has *not* been implemented on the required industry wide basis. Apprentice intake in every trade covered in this study has been down in each year since the peak of 1973-74. This has not been due to a lack of apprenticeship applicants, although the quality of those coming forward has been of concern.

(5) The willingness and ability of firms to take on apprentices are most closely linked with two factors, namely the size of the firm and the volume of work available. In both cases it is a direct relationship.

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26. Tradesmen exhibit asymmetrical behaviour in that the incentive required to make them stay in their trade is far less than the incentive required to entice them back once they have left.

27. Past attempts at recruiting tradesmen from outside Tasmania have been largely unsuccessful. Apart from the high costs involved, the benefits obtained are extremely uncertain since (1) the ability of the tradesmen concerned is not known beforehand, (2) he may be unfamiliar with Australian cars and therefore require retraining and (3) he may accept the job only to leave six months later, either to return home or take up employment outside of the trade.

(6) Apprentices are generally regarded as an inferior source of labour and therefore not close substitutes for tradesmen. Hence their employment opportunities in times of economic downturns are more adversely affected.

(7) Over the past five years wage and other costs have increased substantially in the automotive industry as in all sections of the economy.

(8) The largest firms in the industry, and consequently those with the highest overheads, have been most seriously affected. During the 1960's these firms found it possible to be economically viable with a markup of between 150 and 200% on prime labour cost. Today the required markup varies between 240 and 350%.

(9) The consumer is thus faced with a labour rate which he feels to be excessive given the existence of cheaper alternatives such as small firms and service stations, backyard operators and finally the option of doing the job himself.

(10) The inability of the larger firms to justify to the general public the labour rate differential with which they are faced, has resulted in a substantial influx of small and backyard operators into the industry. The action of Insurance Companies, through the "lowest of three quotes" policy and the flat rate of $10 per hour on insurance work, has also assisted in the trend away from larger firms.

(11) It has been argued that this structural adjustment is justifiable in terms of the increased efficiency at which the larger firms have been forced to operate. This argument implicitly assumes that quality and capacity of service have not suffered. It also fails to recognise the inability of the smaller firms to train the required number of apprentices, thus perpetuating the present undersupply of tradesmen. The improvement of one problem is of little benefit if another problem

of greater magnitude has either been created or made worse. It is the overall welfare gain or loss which is most relevant from society's point of view. The survey results and the expected demand and supply of tradesmen calculations thus verify the contention that major problems exist on the service side of the automotive industry.

5.3 The Alternatives

What is desired, is a situation in which the demand for and supply of tradesmen is in balance. That is, where apprenticeship completions plus any exogenous inputs of tradesmen are sufficient to meet the wastage of the existing stock plus any additional future requirements. Given the initial starting point of excess demand for tradesmen and a deficient demand for apprentices, and given the limited success of past attempts to increase the stock of tradesmen either directly through immigration or indirectly through a lower wastage rate, the long run solution appears to revolve around how best to obtain an increase in the number of persons being trained. Although it has shown itself to be as efficient as government on most occasions, private industry has also shown itself to be fairly mercenary with respect to areas such as education which offer only uncertain returns, after long gestation periods, involving high outlays. For this reason the initiatives in apprentice training are best left to government, who over time have developed the most qualified body of persons to deal with such problems. The alternatives available fall into three main categories:

(1) Those which police quality as well as price, and thus attempt to remove the competitive disadvantage faced by the larger, apprentice employing firms in the industry.

(2) Those which aim to stimulate the employment of apprentices in

general irrespective of the size, nature or industry of the employing firm, and

(3) The government may decide to take initiatives directly and accept responsibility either for part or all of apprentice training.

Under the first category comes the suggestion of compulsory licensing of both workshop and tradesmen. The advocates of this proposal say that it would effectively mean that only qualified tradesmen could legally work on vehicles. Also the workshops used would have to conform to certain safety standards and contain the required level of specialist equipment necessary to perform their intended use. The logic behind this proposal is that it would work in favour of the larger, more reputable firms who would be able to expand to their former size and thus increase the industry's ability to employ apprentices.

Although having many obvious advantages such a scheme would be costly and unpopular to administer, and may be excessively hard on certain smaller firms in the industry. Such firms may be providing a useful and necessary role despite their failure to employ apprentices. The local service station, for example, employing one or two qualified mechanics or experienced lube assistants on routine service work, could well argue that it is performing such a function. Since the nature of this work does not require a high capital outlay in order to provide a high quality of service a lower markup on prime labour cost is required. This saving may be passed on to the consumer via a lower labour rate charged per hour. It must be realized that the operative assumptions in this case consist of the employment of qualified or experienced persons on routine service work, with no loss of quality. If the same firm were offering to perform gearbox and engine overhuals without the required specialist equipment then the situation would be quite

different. This would also be the case given appropriate equipment, but no qualified or experienced persons to use it.

The unacceptability of such a scheme to the "home handyman come motor vehicle tradesman" also presents a serious practical problem. In order to ensure his own safety as well as that of his passengers and other road users, it may be necessary to impinge upon his individual freedom. He is unlikely to accept this, preferring instead to test the policing of the scheme.

The alternative procedure of compulsory vehicle testing, although costly and time consuming to administer, may well obtain the same results in a less discriminatory manner. A cost-benefit study to determine the most appropriate form of such a scheme would be the first step required.

A multitude of options exist under the second category including the present CRAFT and NEAT schemes. These may not necessarily be the most effective methods and there is a general belief within the automotive industry, as well as the community at large, that the present taxation system is badly in need of review. The payroll tax system for example, requires special attention in light of the current high levels of unemployment, especially of the young and unskilled.[28]

Discussions undertaken in the course of preparing this study suggest that reforms in the taxation area would have a far greater effect than the traditional subsidy approach. Although it is often said that apprenticeship subsidy schemes are equivalent to payroll or

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28. In the past firms in the automotive industry have employed many young and/or unskilled persons in positions such as messengers, car clearners, odd jobs men and tea ladies. Today because of increased unionization, increased wages and the level of payroll tax, these positions are no longer available.

other tax rebates this is clearly not the attitude taken by industry itself. Although perhaps not rational, most firms exhibit asymmetrical behaviour in that the taking away of $1.00 in taxation has a greater psychological effect than the granting of a $1.00 rebate on apprentice wages. The problem which is always faced by the policy maker is how to ensure that the stimulus adopted has the desired effect. Accordingly, it may be necessary to tie any taxation reform to increased employment. Alternatively, taxation reform could be undertaken on social grounds, with any increase in employment regarded as a bonus.

Evidence collected during this study also suggests that the continuity of any given scheme may be more important than the actual scheme itself. Continuity of government policy is a vital prerequisite for industry's future planning.

The final category was for government initiatives which involve its accepting direct responibility for part, or all, of apprentice training. This category includes options like pre-apprenticeship training and the possibility of full time courses being set up to train apprentices to a suitable standard so that they could readily be integrated into the smaller firms, who otherwise would be unable to employ apprentices. These apprentices would then complete their training in the normal way.

Despite the many advantages, which may in the long-run justify its adoption, such a scheme would present serious administrative problems such as, Who would select those to be trained? On what basis? In which trades? In which geographic localities? and On what basis would successful trainees be allocated to prospective employers? Even if all the administrative problems were overcome there would still

remain the task of finding a suitable substitute in the training process for actual work experience. As stated earlier, further study is required before such a scheme could be suggested for implementation.

5.4. Final Recommendations

On the basis of the material contained herein, this report recommends the following:

As the only party possessing the required expertize, and being in a sufficiently detached position to obtain an overall view of the problem, government must accept responsibility for ensuring that the present shortage of skilled tradesmen in the automotive industry does not continue in the future. To this end the following recommendations are made

(1) The commissioning of a cost benefit study into the feasibility of compulsory vehicle roadworthiness testing, with the view to implementing a suitable form of testing, given appropriate findings.[29]

(2) That, as a matter of urgency, the present taxation system be examined, with the view to substituting reforms in this area for the present employment subsidy schemes. Reforms in this area should not necessarily be tied to any commitments of increased employment. However, increased employment is a likely result.

and,

(3) That the possibility of full time training of apprentices destined for smaller firms in the industry be more fully examined.

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29. A Legislative Council Select Committee has already advocated compulsory vehicle roadworthiness testing as a prerequisite for the Second Hand Motor Vehicle Bill.

APPENDIX A.

SURVEY OF THE EXPECTED FUTURE DEMAND FOR TRADESMEN IN THE AUTOMOTIVE INDUSTRY.

SURVEY OF THE EXPECTED FUTURE DEMAND FOR

TRADESMEN IN THE AUTOMOTIVE INDUSTRY

NAME OF COMPANY _____

_____

DATE _____

QUESTIONS	CODING ONLY
First of all I would like to ask you some questions about your present labour force.	
1. How many tradesmen (excluding apprentices) do you employ at present?	Automotive Electricians _____ Diesel Mechanics _____ Motor Mechanics _____ Panel Beaters _____ Vehicle Painters _____
2. How many apprentices do you currently employ?	

	1st yr.	2nd yr.	3rd yr.	4th yr.	Total
Automotive Electricians					
Diesel Mechanics					
Motor Mechanics					
Panel Beaters					
Vehicle Painters					

3. Is your present labour force sufficient to meet your present requirements? If not, then state the additional number required.

a) Tradesmen	YES/NO	Additional No. Reqd.
Automotive Electricians		
Diesel Mechanics		
Motor Mechanics		
Panel Beaters		
Vehicle Painters		

b) Apprentices	YES/NO	Additional No. Reqd.
Automotive Electricians		
Diesel Mechanics		
Motor Mechanics		
Panel Beaters		
Vehicle Painters		

QUESTIONS	CODING ONLY
3. continued	c) Other — YES/NO | Additional No. Read.
If we now look at your expected future requirements. 4. How many additional tradesmen (excluding apprentices) do you expect to employ in each year between 1978 and 1981?	
5. What factors do you think have the most influence on the employment opportunities for tradesmen in your industry?	
6. How many first-year apprentices do you expect to employ in each year between 1978 and 1981?	

	A/E	D/M	M/M	P/B	V/P	Total
1978						
1979						
1980						
1981						

	A/E	D/M	M/M	P/B	V/P	Total
1978						
1979						
1980						
1981						

QUESTIONS	CODING ONLY
7. What factors do you think have the most influence on the employment opportunities for apprentices in your industry?	
8. To what extent is your employment of apprentices influenced by the generosity or otherwise of government allowances and incentives?	
9. From your own experience do you think that the employment prospects for tradesmen and apprentices have changed over the past five years? If so, how and why?	a) Tradesmen b) Apprentices
10. During the last five years how many tradesmen have left your employ to take up positions outside of their trade qualifications? Do you consider this leakage significant?	

APPENDIX B.

COMMENCEMENTS, TERMINATIONS AND COMPLETIONS DATA FOR APPRENTICES IN THE FIVE TRADES COVERED IN THIS STUDY.

AUTOMOTIVE ELECTRICIAN

	STOCK AT JULY 1	Commence-ments	Termin-ations	Comple-tions	STOCK AT JUNE 30
1962-63	15	2	-	3	14
1963-64	14	6	3	2	15
1964-65	15	8	2	6	15
1965-66	15	7	3	4	15
1966-67	15	3	-	1	17
1967-68	17	9	-	6	20
1968-69	20	8	1	7	20
1969-70	20	10	-	6	24
1970-71	24	7	4	3	24
1971-72	24	8	2	3	27
1972-73	27	12	2	11	26
1973-74	26	13	-	2	37
1974-75	37	12	3	7	39
1976-76	39	11	2	10	38
1976-77	38	8	-	13	33

FITTER (DIESEL)

1962-63	30	10	1	5	34
1963-64	34	19	1	9	43
1964-65	43	18	-	7	54
1965-66	54	21	1	9	65
1966-67	65	24	-	12	77
1967-68	77	25	2	11	89
1968-69	89	25	1	23	90
1969-70	90	19	2	20	87
1970-71	87	15	4	19	79
1971-72	79	27	2	25	79
1972-73	79	26	1	20	84
1973-74	84	49	5	14	114
1974-75	114	34	4	16	128
1975-76	128	42	8	27	135
1976-77	135	35	4	29	137

MOTOR MECHANIC

	STOCK AT JULY 1	Commence-ments	Termin-ations	Comple-tions	STOCK AT June 30
1962-63	219	87	8	50	248
1963-64	248	93	9	55	277
1964-65	277	79	17	51	288
1965 66	288	99	11	62	314
1966-67	314	110	9	69	346
1967-68	346	87	9	85	339
1968-69	339	104	13	75	355
1969-70	355	104	9	99	351
1970-71	351	104	21	74	360
1971-72	360	104	13	75	376
1972-73	376	117	12	81	400
1973-74	400	139	30	72	437
1974-75	437	116	25	87	441
1975-76	441	123	27	136	401
1976-77	401	131	25	86	421

PANEL BEATER.

1962-63	77	23	2	21	77
1963-64	77	25	5	11	86
1964-65	86	35	7	18	96
1965-66	96	29	8	17	100
1966-67	100	30	9	13	108
1967-68	108	28	11	14	111
1968-69	111	28	9	27	103
1969-70	103	25	8	19	101
1970-71	101	27	3	21	104
1971-72	104	19	3	17	103
1972-73	103	26	9	21	99
1973-74	99	39	10	19	109
1974-75	109	39	12	26	110
1975-76	110	39	14	20	115
1976-77	115	36	8	25	118

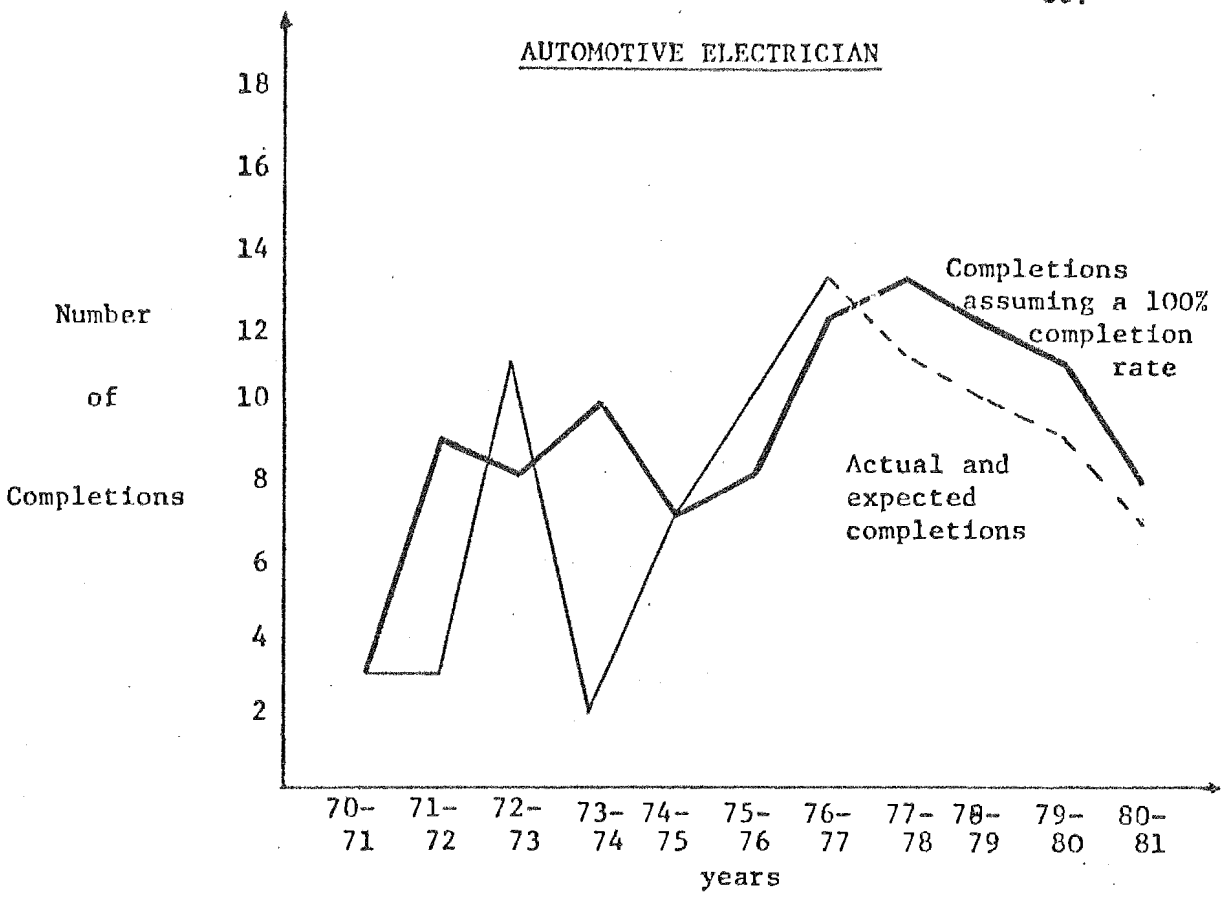
VEHICLE PAINTER

	STOCK AT JULY 1	Commence-ments	Termin-ations	Comple-tions	STOCK AT JUNE 30
1962-63	35	4	3	5	31
1963-64	31	28	3	5	51
1964-65	51	11	7	8	47
1965-66	47	13	2	8	50
1966-67	50	21	4	7	60
1967-68	60	19	6	13	60
1968-69	60	16	2	12	62
1969-70	62	19	7	9	65
1970-71	65	12	9	3	63
1971-72	63	19	2	16	64
1972-73	64	17	5	15	61
1973-74	61	31	5	6	81
1974-75	81	18	10	16	73
1975-76	73	24	10	14	73
1976-77	73	23	5	22	69

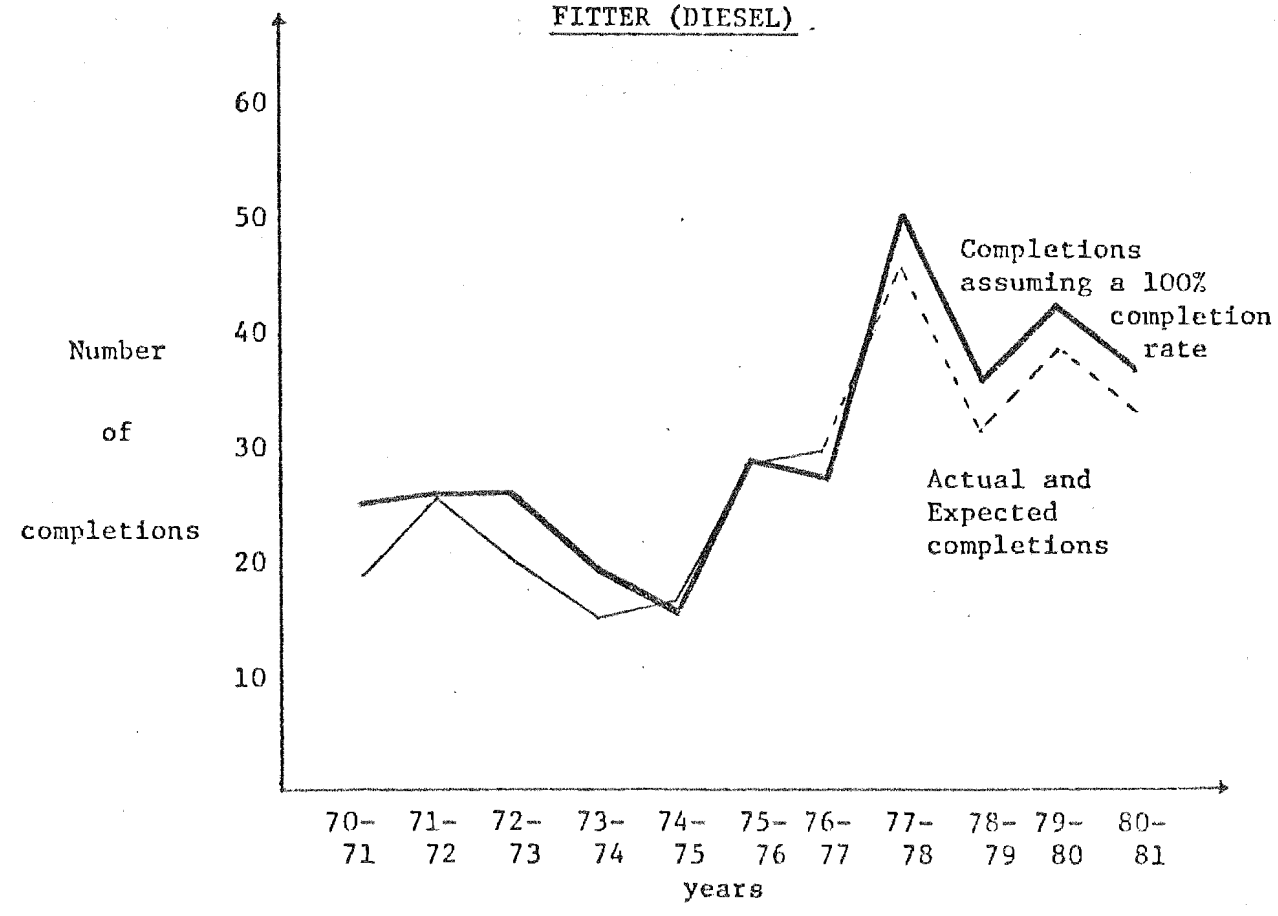
APPENDIX C.

GRAPHICAL PRESENTATION OF ACTUAL AND EXPECTED APPRENTICESHIP COMPLETIONS AGAINST COMPLETIONS ASSUMING A 100% COMPLETION RATE.

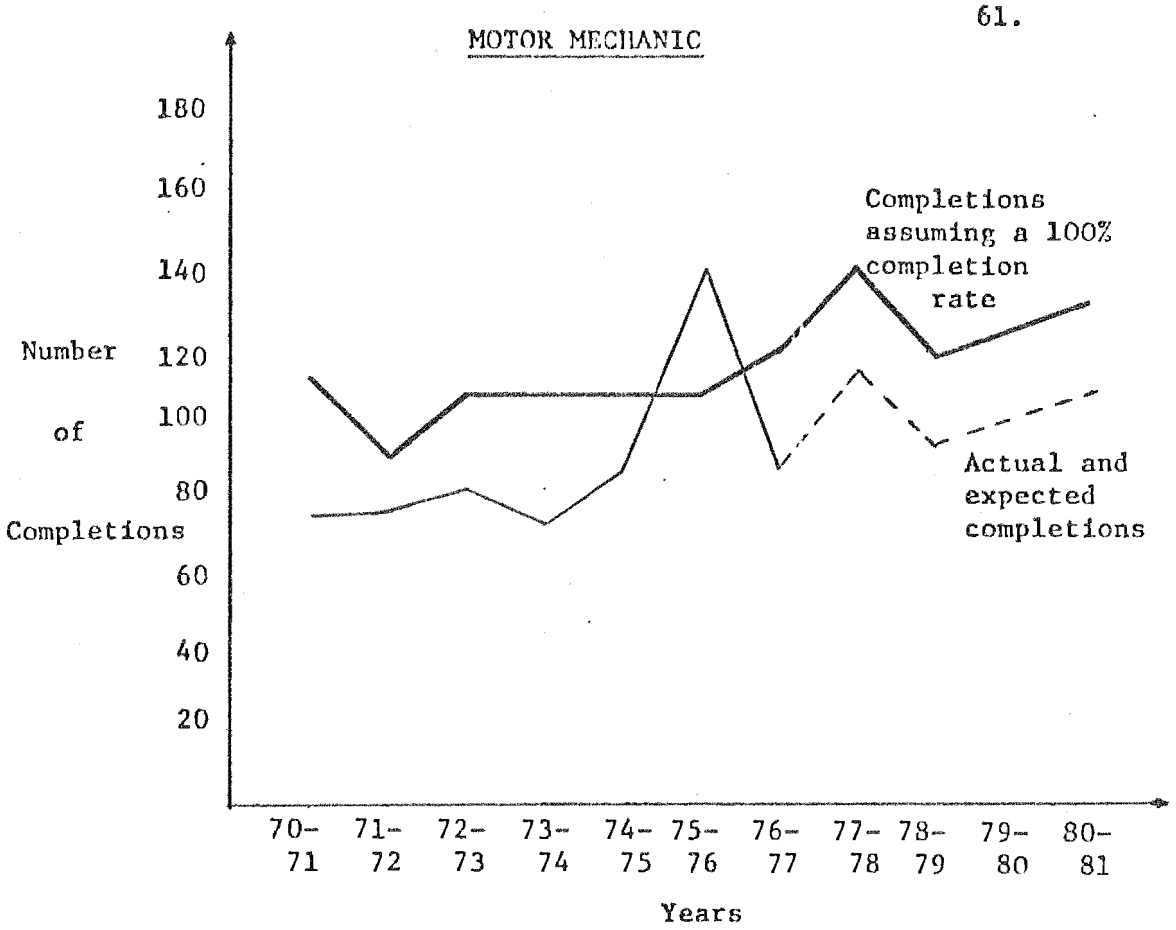
AUTOMOTIVE ELECTRICIAN



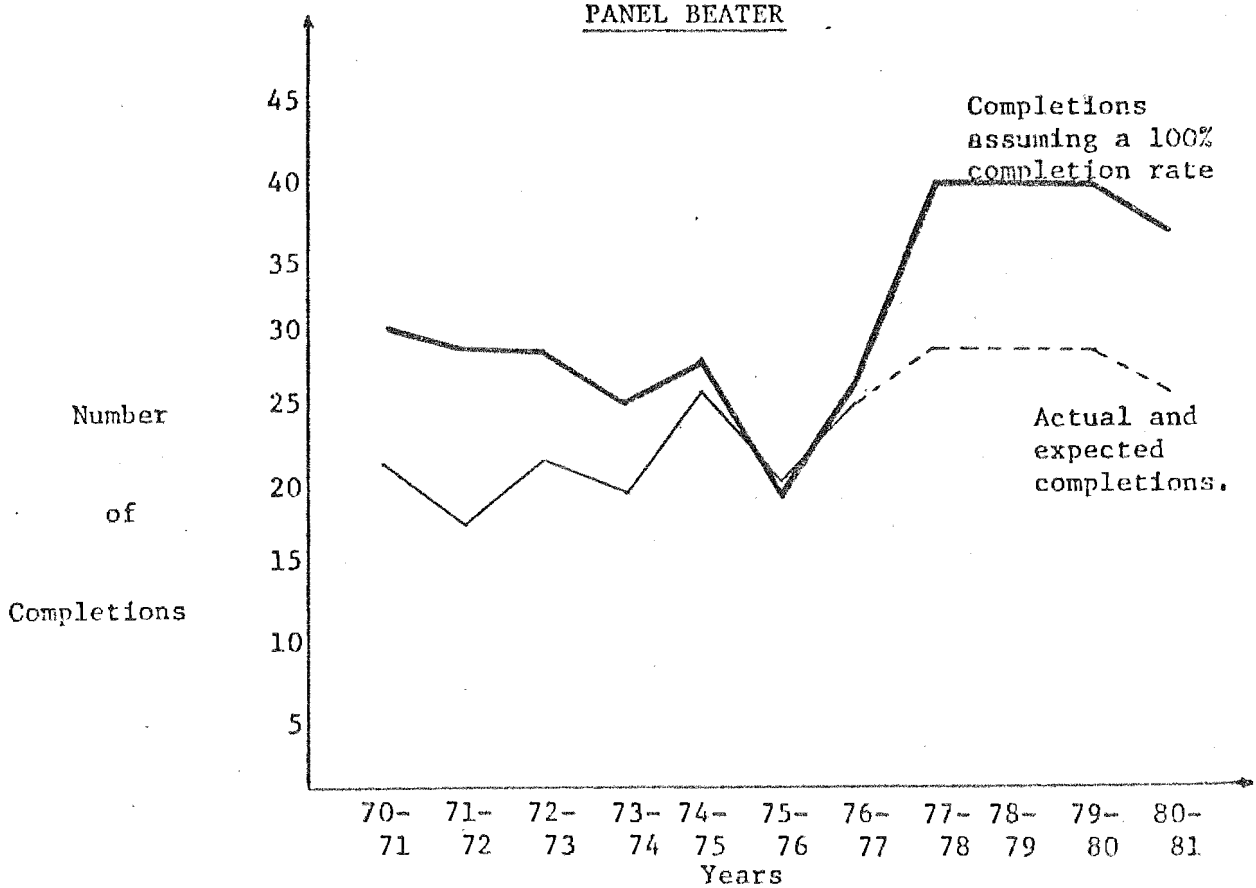
FITTER (DIESEL)

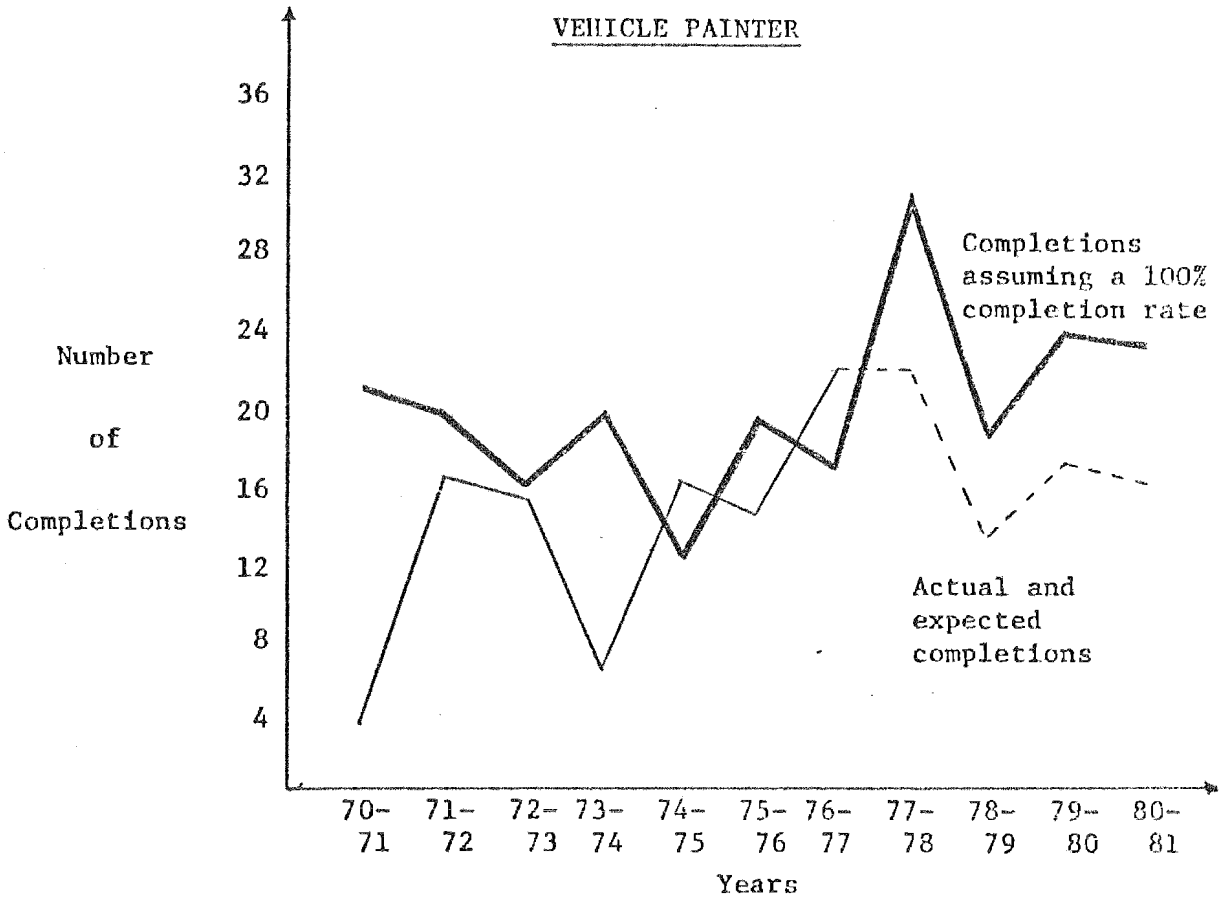


MOTOR MECHANIC



PANEL BEATER




VEHICLE PAINTER
Number of Completions
36
32
28
24
20
16
12
8
4
Completions assuming a 100% completion rate
Actual and expected completions
70-71
71-72
72-73
73-74
74-75
75-76
76-77
77-78
78-79
79-80
80-81
Years

APPENDIX D.

TOTAL TECHNICAL COLLEGE ENROLMENT

AS AT 30.9.1977

Total Technical College Enrolment - as at 30.9.1977

	Yr.1.	Yr.2.	Yr.3.	TOTAL
Automotive Electrician	13	11	8	32
Fitter (Diesel)	45	38	25	108
Motor Mechanic	158	143	108	409
Panel Beater	42	32	43	117
Vehicle Painter	20	14	13	47
	278	238	197	713

The above information was obtained through a written request to each of the five technical colleges at Hobart, Launceston, Devonport, Burnie and Queenstown.

APPENDIX E.

METHOD OF SELECTING APPRENTICES EMPLOYED BY SOUTHERN TASMANIAN FRANCHISE DEALERS.

THE SOUTHERN TASMANIAN FRANCHISED DEALERS

OFFER

APPRENTICESHIPS IN THE TRADES OF

MOTOR MECHANICS AND DIESEL MECHANICS

Preselection tests will be conducted at the Commonwealth Government Centre 188 Collins Street, on Saturday, November 19, 1977.

Application forms are available from your local Commonwealth Employment Service office.

HOBART	GLENORCHY	EASTERN SHORE
lower ground floor 168 Collins St, or contact Paul Picone Phone 28 4230	Cnr Copper and Terry Streets or contact John Beekmeijer Phone 72 6477	30 Percy St Bellerive or contact Bill Taylor Phone 44 4140

APPLICATIONS CLOSE ON NOVEMBER 9, 1977.
SOUTHERN TASMANIAN FRANCHISED DEALERS

SOUTHERN MOTORS PTY LTD
CONTINENTAL MOTORS PTY LTD
CO-OPERATIVE MOTORS PTY LTD
WARWICK MOTORS PTY LTD
SPARCO
PRESTIGE MOTORS
MOTORS PTY LTD
PERFORMANCE AUTOMOBILES
DONALD GORRINGE PTY LTD
D. J. MOTORS PTY LTD
MILES & NICKEY PTY LTD
WEBSTER LTD
TILFORD MOTORS
PTY LTD

Anyone seeking a motor mechanic apprenticeship is invited to sit for the above mentioned tests.

THE MERCURY. 29.10.1977 and 5.11.1977

APPENDIX F.

LIST OF FIRMS INTERVIEWED

IN THE SURVEY.

THE FOLLOWING FIRMS AND THEIR SUBSIDIARIES TOOK PART IN THE SURVEY OF THE EXPECTED FUTURE DEMAND FOR TRADESMEN.

LYN ARCHER MOTORS .
AUTO ELECTRIC PTY.LTD.
AUTOMATIC TRANSMISSION SERVICE.
BARRACK AUTO ELECTRICS.
BAYSIDE BODYWORKS.
BESSANT MOTORS PTY.LTD.
MICHAEL BETTS MOTORS.
CALTEX SERVICE STATION, ULVERSTONE.
BRUCE CARSWELL & CO. PTY.LTD.
G. & A. CLARK.
CONTINENTAL MOTORS PTY.LTD.
CORBETTS BODYWORKS.
CRAMP BROS.
CUSTOM CARS.
CUTHBERTSON'S BODYWORKS.
DAVIES PTY.LTD.
DEPARTMENT OF MAIN ROADS.
D.J. MOTORS.
EASTERN SHORE AUTO ELECTRICS.
ELECTROLYTIC ZINC CO. OF A/ASIA LTD.
ELITE CRASH REPAIRS.
FIGG & GOYNE.
RAY GEARY MAZDA.
LIN GIGNEY AUTOMOTIVE.
GLENORCHY BODYWORKS.
DONALD GORRINGE PTY.LTD.
LING GOWANS.
A.R. GRAY.
F.T. GUY BODYWORKS.
MAX HAYS AUTO ELECTRICS.
HAMILTONS BODYWORKS.

HANCOCKS MOTORS.
D.L. HOLLIS MOTORS PTY.LTD.
G.N. HOPWOOD BODYWORKS .
HYDRO ELECTRIC COMMISSION.
INVERMAY BODYWORKS .
KEVIN JACK MOTORS.
G.M. JACKSON PTY.LTD.
V. JOHNSON.
LANGDONS BODYWORKS .
LANGRIDGE BODYWORKS.
G.W. LEE BODYWORKS.
LEHMANS GARAGE .
LE-MANS MOTORS .
DAVID LEWIS MOTORS PTY.LTD.
LUCAS INDUSTRIES AUST. LTD.
A.V. McCUINNESS.
McPHERSONS BODYWORKS.
METROPOLITAN TRANSPORT TRUST.
MILES & HICKEY AUTOS PTY.LTD.
MILTS AUTO ELECTRICAL SERVICES.
M.M. AUTOS PTY.LTD.
MODERN CARS PTY.LTD.
MOONAH BODYWORKS.
MORSE AUTO ELECTRICAL.
MOTORS PTY.LTD.
MURFETTS AUTO ELECTRICAL SERVICE.
NORTHERN MOTORS DATSUN.
NORTHSIDE CAR ELECTRICS.
NORTHSIDE PANELS.
PERFORMANCE AUTOMOBILES
PRESTIGE MOTORS.
REEMAN & MANNING PTY.LTD.
REPCO AUTO PARTS (TAS.).
W.A. RICHARDS & CO. PTY.LTD.
SOUTHERN SERVICE PTY.LTD.
SPEEDO ELECTRICS.
SPRINGFIELD GARAGE.

DAVID STEWART AUTOS.

TASMANIAN POLICE FORCE.

TERMINUS BODYWORKS.

TILLEYS EXHAUST CENTRE.

TILFORD MOTORS PTY.LTD.

WARWICK MOTORS.

WATERERS BODYWORKS.

VON-BIBRA MOTORS PTY.LTD.

WEBSTER MACHINERY PTY.LTD.

TONY WELLS BODYWORKS.

WESTEND BODYWORKS.

MARK COOK CARS.

CO-OPERATIVE MOTORS PTY.LTD.

APPENDIX G.

LIST OF PERSONS INTERVIEWED, AND
PERSONS PROVIDING DIRECT ASSISTANCE
IN THE PREPARATION OF THIS STUDY.

THE FOLLOWING ORGANIZATIONS AND PERSONS WERE OF DIRECT ASSISTANCE IN THE PREPARATION OF THIS STUDY.

(1) APPRENTICESHIP COMMISSION OF TASMANIA.

- Mr. F.D. Westwood, President
- Mr. G.J. Williams, Secretary

(2) AUSTRALIAN BUREAU OF STATISTICS.

- Mr. C. Johnson

(3) COMMONWEALTH DEPARTMENT OF EMPLOYMENT AND INDUSTRIAL RELATIONS.

- Mr. M. McWatt, Assistant Director, Manpower Research and Information.
- Mr. B. Anstice-Rafferty
- Mr. D. Castle
- Mr. I. Hay

(4) COMMONWEALTH REBATE FOR APPRENTICE FULL-TIME TRAINING (CRAFT)

- Mr. G. Newbold

(5) EDUCATION DEPARTMENT OF TASMANIA, RESEARCH BRANCH.

- Mrs. H. Hocking
- Miss S. Miller

(6) FRANCHISED DEALERS ASSOCIATION.

- Mr. R. Toulmin, President, Southern Tasmania.
- Mr. B. Watts, President, Northern Tasmania.

(7) HOBART TECHNICAL COLLEGE.

- Mr. A. Eyles, Head of the School of Automotive Trades.
- Mr. T. Roper, Head of the School of Panel Beating.

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